

Quadratics

Different Forms

Polynomial $f(x) = ax^2 + bx + c$

Vertex(standard) $f(x) = A(x-h)^2 + k$

factored $f(x) = A(x-R_1)(x-R_2)$

Vocabulary p. 89

- Parabola
- vertex
- zeros/roots
- max/min
- increasing/decreasing
- axis of symmetry

$$h = -\frac{b}{2a}, \text{ K-plug } h \text{ in for } x$$

What you need to do and know

roots

- Factor it
- Quadratic Formula
- complete the square and solve

vertex

- vertex form (h, k)
- Factored (avg. roots to find h , plug in to find k)
- Polynomial (complete the square or find roots)

Form	Roots	Vertex
Polynomial	<ul style="list-style-type: none"> Factor Quad Formula Completing Sq. 	$h = \text{avg. of roots}$ $h = -b/2a$ K - plug h in for x in original eq.
Vertex	<ul style="list-style-type: none"> Solve it $y=0$ 	"see it"
Factored	"see them"	$h = \text{avg. of roots}$ K - plug h in for x in original eq.

Completing the Square

- ① \div by a if $a \neq 1$
- ② Move c -term to other side
- ③ Here is the trick
Take $\frac{1}{2}$ the b , square it,
add it to both sides
- ④ Factor lft side $(x + \frac{1}{2}b)^2$

$$x^2 + 2x - 6 = 0$$

$$x^2 + 2x = 6$$

$$\frac{1}{2}(2) = 1, 1^2 = 1$$

$$x^2 + 2x + 1 = 6 + 1$$

$$(x + 1)^2 = 7$$

vertex $(-1, -7)$

roots \rightarrow solve for x

$$x = -1 \pm \sqrt{7}$$

example

$$2x^2 + 8x + 3 = 0$$

Step 1

$\div a$, if $a \neq 1$

$$\frac{2x^2 + 8x + 3}{2} = \frac{0}{2}$$

$$x^2 + 4x + \frac{3}{2} = 0$$

BUT

Do it like normal

$$x^2 + 4x = -\frac{3}{2}$$

$$\frac{1}{2}(4) = 2, 2^2 = 4$$

$$x^2 + 4x + 4 = -\frac{3}{2} + 4$$

$$(x+2)^2 = \frac{5}{2}$$

To find roots, solve for x

$$x = -2 \pm \sqrt{\frac{5}{2}}$$

To find vertex, put a -term
back in $2(x+2)^2 - 5 = 0$

vertex $(-2, -5)$

Sect. 2.1 Day 2WINDOW PAINS

A special window has the shape of a rectangle surmounted by an equilateral triangle. If the perimeter of the window is 16 feet, what dimensions will admit the most light (i.e. maximize the area)?

